

Application No.: 10/810,634

Docket No.: 2336-256

**AMENDMENTS TO THE CLAIMS:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

1. (currently amended) A method for separating a sapphire wafer serving as a substrate, on which semiconductor elements are formed, into unit chips, comprising the steps of:

(a) grinding a rear surface of the sapphire wafer so that the sapphire wafer has a designated thickness;

(b) lapping the rear surface of the ground sapphire wafer so that the sapphire wafer has a designated thickness;

(c) dry-etching the rear surface of the lapped sapphire wafer so that the sapphire wafer has a uniform thickness; and

(d) scribing the rear surface of the dry-etched sapphire wafer;

wherein said dry-etching is performed after said lapping without a polishing process between said lapping and said dry-etching.

2. (original) The method as set forth in claim 1, wherein the step (c) is performed by an RIE (Reactive Ion Etching) method.

3. (original) The method as set forth in claim 1, wherein the step (c) is performed for 50 seconds or more.

4. (original) The method as set forth in claim 1, wherein the sapphire wafer is dry-etched by 800Å or more in the step (c).

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5. (original) The method as set forth in claim 1, wherein an RF bias voltage of at most 26W is imposed on the sapphire wafer in the step (c).

6. (currently amended) A method of separating a sapphire wafer, on which semiconductor elements are formed, into unit chips, said method comprising the steps of:

(a) grinding a rear surface of the sapphire wafer so that the sapphire wafer has a first designated thickness;

(b) lapping the rear surface of the ground sapphire wafer so that the sapphire wafer has a second designated thickness smaller than the first designated thickness;

(c) dry-etching the rear surface of the lapped sapphire wafer so that the sapphire wafer has a uniform thickness and a processing stress of the rear surface of the dry-etched sapphire wafer is maintained at a designated level; and

(d) scribing the rear surface of the dry-etched sapphire wafer;

wherein said dry-etching is performed after said lapping without a polishing process between said lapping and said dry-etching.

7. (previously presented) The method as set forth in claim 6, wherein step (c) is performed by an RIE (Reactive Ion Etching) method.

8. (previously presented) The method as set forth in claim 6, wherein step (c) is performed for 50 seconds or more.

9. (previously presented) The method as set forth in claim 6, wherein the sapphire wafer is dry-etched by 800Å or more in step (c).

10. (previously presented) The method as set forth in claim 6, wherein an RF bias voltage of at most 26W is imposed on the sapphire wafer in step (c).

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11. (previously presented) The method as set forth in claim 6, wherein the processing stress of the rear surface of the dry-etched sapphire wafer is higher than a processing stress obtainable by a polishing process, thereby facilitating cutting of said rear surface of the dry-etched sapphire wafer with a diamond tip in said scribing step.

12. (canceled)

13. (previously presented) The method as set forth in claim 11, wherein after said lapping, the rear surface of said lapped sapphire wafer includes at least one scratch; and  
said dry-etching is performed to reduce a depth of said at least one scratch, without completely removing said at least one scratch.

14. (previously presented) The method as set forth in claim 13, wherein after said lapping, the rear surface of said lapped sapphire wafer includes at least one scratch; and  
said dry-etching is performed to change said at least one scratch to a shallower scratch having a blunter shape, without completely removing said at least one scratch.

15. (previously presented) A method of separating a sapphire wafer, on which semiconductor elements are formed, into unit chips, said method comprising the steps of:

(a) grinding a rear surface of the sapphire wafer so that the sapphire wafer has a first designated thickness;

(b) lapping the rear surface of the ground sapphire wafer so that the sapphire wafer has a second designated thickness smaller than the first designated thickness;

(c) dry-etching the rear surface of the lapped sapphire wafer so that the sapphire wafer has a uniform thickness and a processing stress of the rear surface of the dry-etched

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sapphire wafer is maintained at a designated level; and

- (d) scribing the rear surface of the dry-etched sapphire wafer with a diamond tip;  
wherein

said dry-etching is performed after said lapping without a polishing process between said lapping and said dry-etching;

after said lapping, the rear surface of said lapped sapphire wafer includes at least one scratch; and

said dry-etching is performed to reduce a depth of said at least one scratch, without completely removing said at least one scratch, thereby maintaining a processing stress of the rear surface of the dry-etched sapphire wafer at a sufficiently high level that facilitates cutting of said rear surface of the dry-etched sapphire wafer with the diamond tip in said scribing step.

16. (previously presented) The method as set forth in claim 15, wherein said dry-etching is performed to change said at least one scratch to a shallower scratch having a blunter shape, without completely removing said at least one scratch.

17. (previously presented) The method as set forth in claim 15, wherein said lapping comprises using a diamond slurry having a particle size of 6 $\mu$ m.

18. (previously presented) The method as set forth in claim 17, wherein a processing stress of the rear surface of the dry-etched sapphire wafer is higher than a processing stress obtainable by a polishing process using a particle size of 3 $\mu$ m, thereby facilitating cutting of said rear surface of the dry-etched sapphire wafer with a diamond tip in said scribing step.

19. (new) A method of separating a sapphire wafer, on which semiconductor elements are formed, into unit chips, said method comprising the steps of:

- (a) grinding a rear surface of the sapphire wafer so that the sapphire wafer has a first

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designated thickness;

(b) lapping the rear surface of the ground sapphire wafer so that the sapphire wafer has a second designated thickness smaller than the first designated thickness;

(c) dry-etching the rear surface of the lapped sapphire wafer so that the sapphire wafer has a uniform thickness and a processing stress of the rear surface of the dry-etched sapphire wafer is maintained at a designated level; and

(d) scribing the rear surface of the dry-etched sapphire wafer;

wherein the processing stress of the rear surface of the dry-etched sapphire wafer is higher than a processing stress obtainable by a polishing process, thereby facilitating cutting of said rear surface of the dry-etched sapphire wafer with a diamond tip in said scribing step.

20. (new) The method as set forth in claim 19, wherein

after said lapping, the rear surface of said lapped sapphire wafer includes at least one scratch; and

said dry-etching is performed to reduce a depth of said at least one scratch, without completely removing said at least one scratch.

21. (new) The method as set forth in claim 20, wherein

after said lapping, the rear surface of said lapped sapphire wafer includes at least one scratch; and

said dry-etching is performed to change said at least one scratch to a shallower scratch having a blunter shape, without completely removing said at least one scratch.